

EOS, Transactions, American Geophysical Union

### Social Sciences

7110 Economics (GroupAwster Protection)
A CONCEPTUAL PRANSFORM FOR MEASUREMETTS OF GOMENIATES PROTECTION
B. L. Favcher (Office of Policy Analysis (TW-2201, U.S. Zeal Formancel Protection Agency, Reshington, D. Calenti

O.S. Essiromental Production Agency, Reshington, D.C.

Addon

There is no increasing concern regarding the

concerning of promovater by hazardous entertain,

The concern is now hairs itself the private and

rubic sector initiatives to implement vests disposal

and other policies designed to protect geometries.

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7310 Economics

ACMETITE IRON JOINT TREATMENT OF MUNICIPAL AND POSITRY
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Double J. Epp (The Femnsylvania State Maireraity,
Tearer Buildios, University York, PA 16802), C. Edwin

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Solar Physics, Astrophysics, and Astronomy

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Vol. 64, No. 7, Pages 65-72

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### Tectonophysics

8160 Plata Tactonics CONSTRAINTS ON EXTENSION OF CONTINENTAL LITHOSPHERE P. C. Englaad (Deartheast of Beologias) Salences, Horr-mas Laboratory, Hervard University, Cambridge, NA

mas Laboratory, Narvard Univarsity, Cambridge, MA
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February 15, 198

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H.J. Melosh (Lener and Plenelsry Lab, U. of Arth.)

Turson, Al 2121, A. Essisky

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# Yews

### Methane Ice On Pluto and Triton

Mediane (CH4), the simplest of organic compounds, is found in the form of a gas associated with many solar system objects. Methane as a gas in the atmospheres of the Jovian planets and satellites and as a liquid on some of their surfaces prohably formed in a primordial chemical reaction between hy-drogen and carbon, not as a result of biological processes. Of interest to planetary scienlists is the predicted occurrence of solid, trystalline methane as an important mineral phase. So far, the solid phases on the icy surfaces of the cold planets and their satellites have been identified as trater (H2O) ice. Recently, astronomers from the University of Hawaii and from the Jet Propulsion Laboratory have discovered crystalline methane on the surfaces of the distant planet Triton, which is a large satellite of Neptune, and on Pluto. These are the only bodies within the solar system so far that may have observable mediane ice, although others may have methane mixtures.

The discoveries of methane were made by analyzing infrared telescope spectra at obser valories in Manna Kea, Hawaii, and at Table Mountain, California (Indust, R&D, January 19831. The methane on Triton's surface apparendy is entirely solid. Pluto's surface has both gaseous (fluid) and solid methane at this time, Recently, Pluto's orbital eccentricity has placed it inside of Neptune's orbit and closer to the sun. This condition will begin to change in 1989 when Pluto's orbit is the class. est it will be to the sun. Eventually, Plum will again be beyond Neptune, and all of its surface methane will be frozen.

Neptune has a more regular, less eccentric orbit than Pluto and thus keeps its large satellite Triton far eunugh from the sun so that the surface is cold enough to keep methane frozen indefinitely. The freezing point in the hard varimm of space should be close in 50 °C, several degrees warmer than Triton's surface, and several degrees colder than Phito's surface at present.

The discoveries of solid methane will be

The U.S. National Committee for Gen-

tablished by the National Academy of Sci-

ences in 1967 tu provide a liaison betweent

the Academy's working arm—the National Research Cunneil—and the national and

International community of geochemists.

hance its visibility in the geor hemical rom-

musing by detailing here the structure and

functions of the committee and by Inviting

Some projects that give a sense of the

activities of the committee include the fol-

eal Society of America meeting. The sym-

of Ruid flow processes and the physical,

presentations of current research in this

· A workshop on Basic Research in Organic Geochemistry Applied to National Energy Needs was organized at the University of South Florida, St. Petersburg.

December 15-17, 1980; the proceedings

An ad hoc committee of the USNC/

W. Rose, H. L. Barnes, and D. Langmuir

and chaired by E. A. Jenne reviewed the

and internationally, (2) provide a national group to speak for the diverse interest

represented in geochemistry, and (8) ef-

fect an appropriate participation by the

United States In international activities in

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Within this context, the USNC/Geo-

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chemistry (USNO/Geochemistry) was es-

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important in pieting together the composi-tions of the outer planets. Voyager 2, will pass close enough to Neptime in 1989 to obtain detailed images of the surface of Triton. Not so with Pluto. Observations of the Photonian surface of a different nature may be available on the same time-frame, huwever, from Space Telescope, which is to be placed into earth orbit in 1985,-PMB

### Tracking Monopoles

If you believe the interpretation placed by Blas Cabrera of Stanford University on the stepped increase of the current circulation in his superconducting ring device recorded a few months ago, you believe that a magnetic monopole has been observed |Phys. Rev. Lett., 48, 1978, 1982). Certain natural events can be considered statistically reliable observationally if they are demonstrated to occur only once. Cabvera set up the experiment carefully, he could be right. The results have triggered a round of theoretical entertainment, the calculations being aimed at analysing the consequences of the deduced 'flux' of monopnles sampled by Cabrera's experiment. S. Dimopoulos, S. L. Glashow, and E. M.

Purcell of Harvard in a joint effort with F. Wilczek of the Institute of Theoretical Physics at the University of California, Sama Barbara, have theorized that this 'monopole flux' comes neither from the earth nor necessarily directly from the sun, but from a cloud in solas orbit (Nature, 298, 824, 1982). They showed, for instance, that if you adjust the theoretical parameters appropriately, the abundance of monopoles parked in holding pattern orbit, originally from a solar or galacric 'monopole wind,' is not so great as to have required wining out the emire cosmic magnetic field. Once established as an orbiting aloud of monopoles, they would rain down unto the earth's surface like meteorites. One slight difference, of contract is that a monotade would pass freely through the annuothere, with an Imming up; Inrther, a money pale would also pass along freely right

and on U.S. participation in international activities in geochemistry, (2) promote international rooperation in geochemistry, (3) inform U.S. geneliemists of such imernational activities and of foreign scientific and technical developments in geochemistry, (4) nominate U.S. representatives to meetings of the IACC and provide informarion and guidance to such representatives, (5) plan and sponsor scientific meet ings of an international character in the United States in accordance with objectives of the IAGC and in cooperation with other U.S. organizations with Interests in geochemistry and related fields, (6) perform duties appropriate to a national continuite of the IAGC, and (7) perform any other functions as appropriate for the benefit and advancement of geochemistry nationally and internationally.

The USNC/Ceochemistry consists of 10 A symposium on Multiple Fluid Flow in Crystalline Rocks at Elevated Temperamembers appointed to serve 3 years wide more than one third of the membership tures is being planned by Maria Luisa Crawford at the fall 1983 annual Geologiretiring at the end of June each year, An effort is made in selecting nominees for membership on the Committee to provide posium will bring together some overviews representation for the major subfields of geochemistry. Coordination with the AGC is accomplished through an IACC flow, as well as provide an opportunity for council member, currently George W. Wetherill of the Carnegie Institution of Vashington, who, as IAGC past-President serves as the Committee's direct link with the IACC Executive Committee and

Council. The current USNC/Geochemistry membership is as follows: V. Rama Murthy (Chairman), University of Minnesota: Keith A. Kvenvolden (Vice Chairman), U.S. Geological Survey, Menlo Park; Lar-Geochemistry consisting of R. J. Vidale, A. ry W. Finger, Carnegie Institution of Washington; David A. Hewitt, Virginia
Polytechnic Institute and State University; U.S. Department of Energy report Status
of Trehnology for Isolating High-Level Radioactive Wastes in Geological Repositories.
The major purposes of the USNC/Ceo-John R. Holloway, Arizona State University; Everett A. Jenne, Battelle Pacific Northwest Laboratories; Fred J. MacKenchemistry are to (1) promote the advancezie, University of Hawaii at Manoa; Jill D. Pasteris, Washington University; and Peter J. Wyllie, University of Chicago. ment of geochemistry in the United States

The Committee meets twice a year, usu ally in conjunction with AGU's Spring Meeting and the annual fall meeting of. GSA. These meetings are attended by the IAGC representative, llaison members, and representatives from government agencies including the National Science Foundation, the Department of Energy, the U.S. Geological Survey, and the National Research Council.

following functions: (1) provide advice to the Bresident of the National Academy of The USNC/Geochemistry soliclis your ideas, views, and comments, wideh should be sent to V. Rama Murthy; Department of Geology and Geophysics, University of Minnesota, Minneapolis, Minnesota 55465 ernment at their request, and to the U.S. geochemical community and the nation at (telephone: 612-373-4136). large on matters concerning geocliemistry

through the earth. The existence and values of the flux of monopoles would have great significance in interpreting the earth's and sun's magnetic fields. Confirmation of the observation and the theory could explain the apparent anomalous temperature distribution in the sun and the solar neutrino problem by means of monopole-induced nuclear decay and other ilierinal processes.

It may or may not be possible to capture a

monopole, but it should be possible to trap a part of one. Like protons and electrons, the analogy is made with magnetic point sources, some with north poles, some with south poles; a magnetic monopole can be either. ust like an electric point charge, the field lines of a monopole are thought to radiate outward in all directions, a free magnetic charge. In Cabrera's device, a superconducting ring is set up to trap some of the magnetic field of a monopole passing through. The field lines could not can the superconducting field, so some of them would wrap around the ring and become detached from the monopole. If the field lines close on themselves, they would induce current in the superconducting ring consistent with Cabrera's observation. If one sample per year is taken, integration over the earth's surface yields a flux (f) of about 0.1 cm<sup>-2</sup> yr<sup>-1</sup> ( $2\pi$  sr)<sup>-1</sup>, which is too great, according to Dinappoulos et al. This flux corresponds to a mass density of about 1 GeV cm 13, which cannot be representative of the universe whose mena mass density tannot exceed 10-5 GeV tm-3. Thus, the story goes, there must be some mechanism within the galaxy to store monopoles and concentrate their abundance. The storage must be well within the galaxy because of die notion that such a flux of monopoles

would destroy galactic magnetic fields. A number of the constraints as to where the monopoles could originate derive from the theoretical resolts of E. N. Parker of the University of Chicago (Astrophys. J., 139, 207), 1264 and 160, 383, 1270). The flux is at least 10° too great to have originated from the earth's core, assuming a steady state, and trus great to have originated from the sun unless the numopoles (calculated to be some 1036 in number) are located at the sun's center and are occasionally released by traitsright solar

Instead, Dimopoulos et al. suggest that a diffuse cloud of monopoles is in Newtonian orbit around the sun like meteoritic dust. Their density, calculated to be about 10-15 cm<sup>-1</sup>, implies that there are 10<sup>24</sup> monopoles within the earth's orbit. Their residence time in orbit would be about 100 m.y., which would require an influx of about 109 monopoles per second from galactic sources or from the sun itself. This number would be acceptable according to a relationship based on Parker's theories which provides an upper limit to the number of monopoles (a) within the earth or sun as follows.

where B is the planetary (geo or solar) mag-uetic field, v is the monopole velocity within the planetary core, and T is the growth time of the field. The characteristic time of the solar magnetic field is assumed to be about 20 years, the length of the sunspot cycle. This value is consistent with considerations of magnetic diffusivity for the solar field if poles exist in the sun. Monopoles travelling through the sun would transfer heat from the interior and catalyze nuclear fusion or nucleon decay processes. Measurement of the electron antinentrino flux at the earth could confirm this idea.

To check the hypothesis, it will be required to observe the monopole flux to be like the earth's meteorite flux in velocity distribution, angular distribution, and seasonal and diurnal variations. The earth would pass through a cloud of monopoles as it does through melcorites.—PMB

### **Another Option** For Ocean Drilling

After reviewing long-range plans for erust-al studies, a Nadonal Science Foundation (NSF) advisory group unanimously agreed that the most economic and favorable platform for scientific ocean drilling would be neither the Glomar Explorer nor the Glomar

Challenger. The group's choice: to lease a commercial drilling ship.

Unlike previous groups, the NSF Ad Hoc Advisory Croup on Crustal Studies, chalred by ACU President-elect Charles Drake, examined ocean drilling while considering other crustal studies and budget projections. The Conference on Scientific Ocean Drilling (CO. SOD) (Eds., December 22, 1981, p. 1197), the National Science Board (Eas, April 6, 1982, p. 219), and a National Research Council commisses (Eas, November 2, 1982, p. 835) all chose the Glomar Explorer as the desired option, however, they weighed alternatives based only on the scientific merits of drilling and did not look at crustal studies as a whole. or look at budget projections,

### Radio Science **Editor Appointed**

Kung Chie Yeh, professor of electrical en-gineering at the University of Illinois, Urpana, has been appointed editor designate of Radio Science. He will succeed Akira Ishimaru. who will continue his duties through the end of June. Ishimaru's term has been extended so that the transition between editors will be smooth. Yeh will become editor on July 1. Persons submitting papers after April 1

hould forward them to: Kung Chie Yeli Editor, Radio Science Department of Electrical Engineering University of Illinois

Urbana, IL 61801 During 1979-1981, Yeh was an associate editor of Radio Science and also served as coguest editor in 1980. His appointment to the four year term ends December 1986.

During the last several months, the market for commercial drilling ships plummeted, thus making available about half a dozen ves-sels. The ail hoc group felt that leasing one of these ships would be the most desimble nution for the continuation of scientific ocean drilling. Among the ships that could be considered are the Discoverer Seven Seas, the Ben Ocean Lancer, several ships from Sedco, Inc., and several from Global Marine, Inc.

A leased commercial shiply would offer many of the benefits of the formerly lavorite choice, the Explorer, but would have the advantage of including a riser and blow-out prevention system (see table). Such a system would be desirable for the Explorer, but all of those endorsing the former CIA salvage ship recognized that the system would be far 100 expensive for many years. The Challenger, which requires an overhaul for continued service, would not be the preferred option given the availability of commercial vessels, the gratus noted.

The ad hoe group also stressed that evenrually half of the funds for scientific accan shilling should be supplied by foreign partiti-

If the group's recommendation is approved by the NSF director, the Office of Science and Technology Policy, and the Office of Management and Budger, then a request for proposals will be issued. No additional lunds above the \$26.3 million slated for ocean drilling in the fiscal 1984 budget proposal (Ess. February 15, 1985, p. 65) would be needed to lease a commercial ship. However, Congressional approval for that funding level and for the program would be required before a contract could be signed. Once a contract is signed, drilling could commence within 10 or 12 months, estimates Allen M. Shinn, Jr., director of scientific ocean drilling in NSF. In the interim, engineering plans and modifications to the selected ship would be carried

The group had four tasks to be reported on when it met at NSF headquarters earlier this month:

• review long-range plans for crustal studies within the university-based earth and ocean sciences

• assign relative priorities to initiatives in crustal studies in the context of likely budgets for fiscal 1984 and future years, with particular attention to the relative priority to be assigned to ocean drilling

News (cont. on b. 74)



F.D. Stacey, M.S. Paterson, A. Nicholas editors Current progress in the study of attenuation and creep is emphasized in this vol-

Explored here is the possibility of applying linear viscoelastic theory to seismic wave propagation. Present-day opinion on deformation of the mantle is scrutinized and the possibility that crystal dislocations may ba responsible for both the plasticity and anelasticity of the mantle is discussed. An important basis for further study, this book aides the scientist and student to keep abreast of topical research.

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fair-good 852 nr² Laboratory space  $426 \text{ m}^2$ 1,800 m<sup>2</sup> Surree: NSF Office of Scientific Ocean Drilling For comparative purposes only: a request for proposals would be issued for bidding from commercial drilling crimpanies if the administration acts on the ad hoc group's recommendation.

than other

\*The Glomar Explorer has the raparity to carry 4,000 m of riser string. · advise, within the framework of these priurities, nu the relative merits of the Glomm Challenger, the Glomav Explorer, and a third

Sea keeping rapacity High latitude capability

• emisider what mix of research programs and associated facilities, within constrained budgets, will best arldress the scientific opputnuities in crustal research.

The final teport of the going is exprited within twir months.

The members of the NSFAd Hoc Advisory Group on Constal Studies are Donald L. Auilerson (Geosciences Department, California lustitute of Technislogy); W. Edward Bingman (drilling engineer advisor, Shell Oil Company); Kevin C. Hurke (Department of Beological Sciences, State University of New York at Albanyl; William R. Dickinson (Departition of Geosciences, University of Arizona in Turamett, Charles L. Brake (Department of Earth Sciences, Dartimonth Collegel; Myron K. Horri (Cities Service Company, Tulsa, Okla.); John Hower (Department of Geology, University of Illimois, Urbanat: John Imbrie (Department of Geological Sciences, Brown University it John A. Kitanss (School of Occanography, University of Rhode Island,

Kingston); Jack E. Oliver (Department of Geological Sciences, Cornell University); Cecil B. Raleigh (Lamont-Doherry Geological Observatory); Robert H. Rutford (University of Texas at Oallas); Eugen Seihold (Deutsche Forschingsgentienschaft); Derek Speucer (Woods Hole Oceanographic Institute); and Francis G. Stehli (College of Geosciences, University of Oklahoma in Norman).--B7'R

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### Wet January for Nation's Streams

The nation's streamflow picture was generally wetter than usual in Januacy, except in the East, according to a cherk by the U.S. Geological Survey (USGS), Department of the

USGS hyalrologists said that innie than sug of the key index gaging stations across the country reported average or above-average streamflow thining January. Of the Mations reporting below average streamflow, most were in the eastern part of the country,



with small, dry areas reported in Kansas, Ne-braska, Texas, and Ohio. In the castern Unir ed States—from Maine south to Florida and west to Pennsylvania and Tennessre--21 of the 65 key index stations reported streamflow that was much below average for the mouth. within the lowest 25% of record,

Reflecting the generally wet picture across the cumry, combined flow of the nation's Big Five' rivers—Mississippi, St. Lawrence, Columbia, Missauri, and Dhio—avetaged 1,021 billion gallims a day (bgd), 40% almove average for the month. The combined flow is down about 15% from the December average, as major floods receiled in Illinois, Arkansas, Lonisiana, Missouri, and Mississippi. January was the eighth straight mrunh that the combined flow of the Big Five was alread average.

Since die 'Big Five' rivers drain more than half of the conterminous United States. USGS hydrologists use their flow as a contrnient guide to the condition of the nation's

water resources.

81G FIVE: Individual January Hows—Mississippi River near Vicksburg, Miss., 677 light. 66 percent above average, but 9 percent below December: St. Lawrence River mear Massena, N.V., 150 hgd, within I percent of average, but down 1-f percent from last month; Ohio River at Louisville, Ky., 61 hgd, 38 percent below average, drivit 39 perrent from December; Missouri River at Hermann, Mo. 51 bgd, 136 percent above average, but still down 57 percent from the previous month; and the Carlumbia River at The Dalles, Ore., 82 hgd, 47 percent above average and 16 percent above Derember.

## Books Climate Variations and

Variability: Facts and Theories

A. Berger (Ed.), NATO Ads. Study Instit. Ser., Ser. C. Math and Phys. Sci., vol. 72, O. Reidel, Hingham, Mass., xxvi + 795 pp., 1981.

Reviewed by C. Nicolis

Evet since the realization, about 20 years ago, that the mild and predictable climate of the hrst half of our century was an anomaly within the climate's long and turbulent his tory, specialists, policy makers, and the general public feel increasingly concerned about the possible imparts of clitinatic change on an

S ISBN 0-87590-206-5 Climatic Changes

M.I. Budyko Euglish Traus., R. Zoliva English Trans., editor, L. Levin (1977)

The application of physical climalology in studying climatic changes is the main problem presented in this

to also tients with the effect of climatic changes on biological processes including the evolution of living organisms. Ho presents the need to develop methods, and offers suggestions, for controlling climate modifications.

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nver populated and energy-thirsty society. Yet for all its importance, the share of this held in modern scientific literature is surprisingly slim. In this respect, the present book, which compiles the fectures given at the first International School of Climatology organized un-der the auspices of Ettore Majorana Center and NATO at Erice, Italy, in March 1980

constitutes a welcome contribution. A number of monographs and proceedings volumes on various aspects of climate are available. There is no doubt, however, that the present contribution gives a more com-prehensive view of the subject, both broader and deeper than the previously available re-

The book is organized into seven parts Mathematical and Physical Basis of Cli-mate (five lectures), in which a general survey of the principal aspects of climatic change and of some of the mechanisms involved is

 Mathematical Techniques in Climate Re-construction and Data Banks (three lectures), in which information is supplied on the statislical methods and other tools used to analyze data, in view of climatic reconstruction.

3. Facts: Reconstruction of Past Climates (16 lectures), the longest of all parts. Here, loug and intermediate scale climatic changes are described as they appear in the light of experimental work using oxygen isotopes, ice core, and other techniques. Moreover, a number of case studies is presented on recent elintatic anomalies, an spheric circulation and air-sea interactions is

examined in this context. 4. Theories of Climatic Variations and Their Modeling (nine lectures). Possible facints at the origin of climatic change are analyzed, and numerous suggestions are made on the role of internal mechanisms [feedbacks etc.) and external forcings (orbital variatlons, solar output, etc.). Moreover, a number of mathemotical models are developed. which are suitable for the analysis of different situations orising in the context of climatic cliange. Special emphasis is laid on energy-balance (Ghil) and statistical (Hasselmant) models, but a general overview of other approaches including general circulation models

is provided in a chapter by Gates. b. Man's Impact on Climate (six lectures). Most of this part is devoted to the carbon cycle and the CO<sub>2</sub> problem. Some general considerations on air pollution are also present.

6. Climate Impacts on Man (two lectures).
This short patt deals with the impact of climatic variability on agricultural and other resources, as well as on economy.

7. Summary—Review of the Lectures (three lectures), in which a critical survey of the topirs covered in the various chapters is

A useful 23-page subject unlex keeps mack of the main entries.

From the abuve summary it is clear that there is considerable disprepartionality be-tween the seven parts of the bank. Equal rayerage of all aspects of climate is probably im-possible, considering the large diversity of the problems involved in the subject. It seems to me, however, that overall ruberence and readability would have been culiamed if the material of the weakest, less represented parts were included in some al the chapters of the major parts in the form of discussion sections and further elaborations. In mildition, some of the subdivisions lank artificial. For instance, the rationale behind the distinction between 'Modeling' and 'Theories' in part 4 is not clear to me. Morenver, present-

ing part 2 as dealing with 'mathematical techniques' is misleading in view of part 4.

One of the most informative chapters of the book is Berger's account of the spectrum of climatic variations and possible cuuses in part 4. For their tutorial value, I would like to single out the chapter on 'Climatic Changes and Variations: A Geophysical Problem' by Newell and Chiu in part I, and the chapters on 'The Climatic System and its Portrayal by Climate Models' by Gales and on

nce Models' by Ghil in part 4. In conclusion, despite some weaknesses the volume is a valuable contribution which should be consulted by all researchers interested in the field. It is a source of useful material and of many up-to-clate references. More importantly it reveals the many facels of modern climatology, its beauty, the multiple challenges that it poses to society, and for these reasons it deserves to become a standard reference book for years to come.

C. Nicolis, Institut d'Aeronomie Spatiale de Belgique, Brussels, Belgium.

### New Publications

Items listed in New Publications cao be ordered directly from the publisher; they are not available through AGU,

Hydrothermol Chemistry of Zeolites, R, M. Barrer, Academic, New York, ix + 360 pp.,

Sotellites of Jupiter, D. Morrison (ed.), with the assistance of Mildred Shapley Marthewa, University of Arizona Press, Tucson, x.+

### The Uses of Color

Forum

r olor graphics in Ard ; publications may passaprappe and sto communication but care will have to be taken to assure that they really contain extra information nestead of the same old information in a sester package than anyons tell me for example, why the essentially mounthrong, vellow red thett lake coloring methe cover of Los. December 7, 1982 contains more information than a goal black and white version would?

Lumber, and graphed display sheller in color or not, ought to be described in comprehensible terms. The caption to the cited cover of the was I bound, soulising in the original version in Cooplished Reand between tall tree much so that let let a translation? for the interested readert. The excerpted caption in Lock all the more confusing for lack of context and ibistrates the dangers of excelpting with-ામ જોવેલ

The theta image of the saids arrors seen from space is a starting and brainful discovery, and its limbers are to be congratulated. But they should pay the attention (as should we allt to the ordina meaning of words, Goophysicists should strive to write so clearly that even when then words are lifted out of context for the reliberation of the masses, they are sill meaningful. Low trailers should not have to go to great lengths to bud significance in what is otherwise metrly a preny pic-Irp P.

GRI, original read 9, p Innit: The apparent position of the 111-2 orbit sonesponds to the central vertical scan line of die image.

Providence The track of the DL-2 orbit represented by the time abseiva or this Plate is shown on Lignre 1.

Note also that the sentence in the GRL caption beginning 'Spaceccalt motion' belongs to Figure 1 and Plate 1, not Plate?

> Department of Levelogs and Geography Current of Massachust

### Remembering Earlier Days

My connection with AGP began in 193 following a regional seminar and meetings in Oklahoma City. The late Dr. Nebon Sayre spraisored my membership, just as was runbacking on a career in water resources investigation. Then, after about 6 years with the Texas Board of Water Fagineers, I served 32 years with the U.S. Geological Survey in hydrological and graphysical studies in several states and a national headquarters as a staff scientist and administrator before retirement in 1973, after which I've close some consuling work. A long association with the growth and development of geophysics has allowed me to see the dynamic part AGD played to the prowth and develop-

Today, as a retired carth scientist, I want or make a modest contribution in the muladgu to undergird the line AGU livestments. These investments, in addition to a well-located building for permanent headquarters and cental horome, include the vast A1411 beurlits to grophysicists in lederal service, the academic geophysical community, and certain areas in private

AGU investments and benefits to our . very large body of scientists include provision of high-quality formus and journals for exchange of geophysical information It is my hope that response to the 5-year AGU-GIFT drive will put the thrive over the top. Such gifts are sound havestments

Joseph W. Lang

Note: The abuve letter came from one of AGU's life incinbers, whose contribution gives him the status of Individual.

Supporting Member.

A Life Supporting Member recently wrote to us that although raising money not his hag, he feels we are doing some good and gindly supports our work. His reason for supporting us is that 20 years ago AGU supporting us is that 20 pages ago AGU supported the early developing ment of Isotope geology and at that time, the Union never asked for anything. Not he feels that because he benefited from AGU's earlier initiatives, his present support seems. port seems reasonable.

Have you remembered what AGU hat done for you laiely or perhaps even long. ago?

> Charles A. Whiten Cochairmen, GIFT Steering Committee

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### POSITIONS AVAILABLE

Assistant Research Oceanographer/SIO. The Ocean Research Division of Scripps institution of Oceanography invites physical oceanographers to apply for a position as Assistant Research Oceanographer, the research equivalent of Assistant Professor (Ph.D. in physical sciences or equivalent degree requiredt. Candidate must have strong background in applied mathematics and fluid dynamics; strong interest in ocean dynamics; and proven research and publication record in physical oceanography. This position is funded through ONR conffact for two years. Appointment beyond two years is rontingen on candidate obtaining extramutral support. It is expected that the majority of research clori during the two years will be devoted to the theory and analysis of data on Kurashio variability. Salary range is \$22,900-\$26,800 commensurate on qualifications. Position stan date is approximately 4/1/83. Please send resume and at least three references to Dr. Russ Davis, Chairman, Ocean Research Division A030, Scripps Institution of Oceanography (E), La Jolla, CA 02093 by March 15, 1983. For additional information about the position contact Dr. Peter Niller (619) 452-4100. The University of California. San Diego is an Equal Opportunity/Alfirmative Action Employer.\*

Postdoctoral Research Associate Minerslogy. Ap-plications are invited for research in high-residution and analytical transmission electron microstops of minerals and their analogues. Experience in crystal-lography, materials sciences, or electron microscops is desirable. Send resume titichiding transcripast, satement of research differents, and manes of three references to Dr. P. R. Buserk, Department of Geof-ogy, Arizona State University, Tempe. AZ 87287. ASU is an EO/AA employer.

ransactions, American Geophysical Union The Weekly Newspaper of Geophysics

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Cover. Small drag fold in siliceous phyl-

lite of the Permian-to-Triassic Burnt River Schist north of the Conner Creek fault, NE Oregon. The Burnt River Schlst originated by intense deformation of cherts along e major sultire between Jurassic arc-derived sediments ond Permian-to-Triassic oceanic terrane. Photograph is a 20% enargement of subject. (Photo courtesy of Ellen D. Mulien, Department of Geology, Oregon State University.)

Marine Geophysicial/Texas A&M University. The Department of Oceanography of Texas A&M University will have an opening for it tenuce track laculty member in Marine Geophysics beginning September 1983, Prefeccine will be given to candidates with a strong quantitative background in a wide range of geophysical topics and who have hold interest and experience in marine exploration. The successful applicant will be expected to teach indergraduate and graditate courses and to conduct a vigorous cescarch program in his or her specialty. The position is to lie filled at the level of Assistant Professor. A Ph.D. is required for this position. Salary is negotiable depending upon experience and qualiferations.

Applicants should submit a vita along with a letter dex ribing hisher research and teaching goals and names of five pessons for reference to Professor R.O. Reid, Head, Department of Oceanography, Texas A&M University, College Statlon, TX 77843. The elosing date for applications is March 15, 1983. Texas A&M University is an affirmative action/equal opportunity symployer.

equal opportunity supployer.

Naval Postgraduate School. The Department of Oceanography invites applications for the position of Adjunct Research Prifessor in the Ocean Turbulence Laboratory. The successful applicant will be respunsible for the organization and esecution of oceanic turbulence measurements as well as the interpretation and reporting of the obtained data. The position cequires a Ph.D. or equivalent in Physical Oceanography. S years of post-doctoral experience with oceanic measurements and data interpretation, and some lamiliarity with turbulence instrumentation. The Ocean Turbulence Laboratory is actively engaged in the measurement and interpretation of oceanic measurement and interpretation of oceanic mubulence data from a variety of environments obtained with several types of vehicles. The successful randidate will be especied in contribute to the growth and development of the scope of the research performed by the laboratory.

Applicants should send a resume, statement of research cecond and interests, and the names of at least three references to Prof. Thomas R. Deburn, Code Gatter, Naval Postgraduate School, Monterey, Applications will be considered will be a considered.

CA 93940.

Applications will be considered until March 15, 1983. Applicants should provide a curriculum vitae, three professional references, and a statement of professional research and instructional) goals. Send leners of application to: Professio Christopher N.K. Moners, Charman, Department of Oceanography, Naval Prograduate School, Monterer, CA 93940, Phone: (408) 646-257-2553.

An Equal Opportunity Atlantage, Natlantage, Callerian and Caller An Equal Opportunity/Affirmative Action Fin-

Position in Patrology/Rirs University, Houston, Texas. The Department of Geology has a tenurcitark opening beginning July 1983 with starting level of appointment depending on the experience of the candidate. The faculty member is expected to establish, or continue a vigorinus research program in petrology and to participate in teaching in mineralogy-petrology. Research aceas in which we are potentially interested include: igneous petrology, metaming of fluids with micks and sediments, isotope geochemistry, but other specialties ace not estrology incontinued from consideration. Available research farilities of the Department include: electron-mirroprobe, ICP-spectrograph. Ar-Ar dating, and stable light isotope mass-spect minery. Send rurriculum vitae, a statement of planned research, and names of at least three references to Dr. A. W. Bally, Chairman, Department of tenlogy, Rice University, P.O. Box 1892, Houston, Texas 77231. Rice is an equal opportunity employer.

Assistant/Associate Professor, Navat Postgraduate School. A tenuce-track position at the Assistant or Associate Professor level is immediately available in the Department of Oceaningraphy of the Naval Post-grathiate School, Montetey, California, A satellite the hepariment of Oceanigraphy of the Naval Posigrainate School, Montet ey, California, A satellite
geophysicist/geodesist or dynamical oceanigrapher
(with an interest in satellite shimetry and related
topics), whire can teach and cesearch in the MC&C
(Mapping, Charting, and Geodesy) areas of the Hydrographic Sciences, Decanography, and related
rusticula is songlat. A successful applicant will be
able in develop a strong studynt thesis research pringram; teach courses in physical geodesy, satellite gendesy, quantificitive remote sensing, rigital data analyals, data base management, marine geophysics, and
related topics; and have ringulance of problems in
physical oceanography, especially those pertaining
to suellite altimetry. Students are primarily from
the Defense Mapping Agency, Naval Oceanographic
Olfice, NOAA Corps, and U.S. and allied navies.
An acalemic or professional background in marine
geodesy, marine geophysics, or dynamical oceanography, logether with an adaptive, progressive, and Conference

### **FUNDAMENTAL MAGNETOSPHERIC PROCESSES** IN THE PLASMAPAUSE REGION

October 25-27, 1983

The University of Alabama in Huntsville NASA/Marshall Space Flight Center Huntsville, Alabama

Conveners: J. L. Horwitz and J. L. Green

This conference is designed for experimentalists and theorists concerned with wave and plesma processes in the vicinity of the plasmapause. Appropriate topics for papers to be presented will include: wave phenomena associated with the plasmapause; sources and loss of cold and warm plasmas near the plasmapeuse; plesmasphere filling; identification, structure, formation and dynamics of the plasmapause; relationship of lasmapause to other important magnetospheric boundaries. Attendance will be limited. Persons wishing to present papers should send an abstract (use convantion for AGU meeting abstracts to one of the conveners by July 9, 1983, Information on hotel ions will be provided on request.

Dr. J. L. Horwitz Department of Phyalcs The University of Alabama in Hunteville funtsville, AL 35899 205/895-6276/ 453-0505.

Dr. J. L. Greeo Magnatoapharic Physics Branch/ES53 Space Sciences Laboratory Merehall Space Flight Center MSFC, AL 35812 205/453-0028

scholarly nature, are required. Salaries are compen-tive. Llosing date for applications is March 8, 1983. Interview mus should octar in March and April A decision on an offer should be made by June. We expect the smooth candidate to start in 14 thro-ber Analysis and April 2006. bet. Appleants should provide a Currendian vitae, three professional references, and a statement of professional research and instructional) goals. Send letters of antiha market.

Telephone (108) 646-2552 or 2553 The Naral Postgraduan School is an Equal Lin-dover. Typ-orthinity and Affirmative Action em-

Geophysicist/University of Montana. The Geology Department of the University of Montana is inviding applications to filt a tenure track position at

widing applications to fill a tenure track position at the assistant of associate professor level with a specialized area of geophysics beginning Sept. 1983. Teaching and research responsibilities at the undergraduate and graduate levels. Research interests should combine solid earth geophysics and geology. Applicant must have the Ph.D. degree or expect completion by summer 1983. Those interested should send a letter of application, resume, an outline of teaching and research interests and other celevant material. The application should arrange to have at least three letters of recommendation sent to: Arnold J. Silverman, Chairman, Department of Geology, University of Montana, Missoula, MT 59812.

The University of Montana is an affirmative ac-

Postdorioral Posttlon/Scismology. Postdoctoral support in seismology is tentatively available for up to a 24-month period. Seeking a recent Ph.D. with interest in cegional seismic wave/surface wave propagation. Applications should be sent to: Dr. Robert G. Hermann, Department of Earth & Atmospheric Sciences, St. Louis University, Box 8099, St. Louis, MO 63156, 314-058-3120. St. Louis University is an affirmative artion/equal opportunity employer.

Research Associate. Applications are invited for a possible appointment as research associate in theo-terial plasma astrophysics, space plasma physics and/or cosmic-ray physics. The successful applicanrefinal plasma astrophysics, space plasma plus des and/or cosmic-ray plusies. The successful applicant will be expected to spend a substantial part of his or her time working on problems in solar or interplanciar) physics. Appointments will begin in sommer 1983 or lain Applicative should powers a recently asquired Ph Octiva a relevant area of physics, astronom, or planetary science. Inquires should be addressed to Prot. J. R. Jokqui or Prof. F. H. Levy, Department of Planetary Services, Lutian and Planetary Laboration. Phiseisia of Ariona, Thoson 85721.

Applications should be accompanied by a resume, complete bibliography, and at least two letters of recommendation from persons who are well-asomatical with the applicant's background and potential. All material should be received by April 15, 1983. Ar Equal Opportunity, Allumative Action, Title IX, Section 504 Employer.

Research Associase/Upper Atmospheric Phys-

Research Associase/Upper Atmospheric Physica. The National Research Lournal (Canada) is building a multi-instrument ground based research facility called CANOPUS. One part of CANOPUS is a Data Analysis Network whith will provide interactive arcess to the CANOPUS data by scientists across Canada. A research associate position exists for a person who would be associated with implementing and operating this network. This position will allow some independent research on aspects of the CANOPUS data and the holder of the position would be encouraged to undertake such research. The position requires a Ph.D. in some aspect of upper atmospheric physirs Ipreferably ground based) and extensive computer networking, etc. would be an advantage. The initial salary will be in the range from \$24,000 to \$27,000 per year, depending on experience. The appointment will be initially made for two years and commences its soon as possible.

as possible. Send resumes and the names of three referees to: Professor J. A. Kochler Institute of Space and Atmospheric Studies University of Saskatchewan Saskatoon, Saskatchewan S7N OWO

SENIOR RESEARCH SCIENTIST/TRAINING MANAGEMENT POSITION International Ground Water Modeling Canter

A position will become available July 1, 1983 for a Sanior Geohydrologist to direct the international Ground Water Modeling Center (IGWMC) at Butler University's Holcomb Research Institute in Indianapolis, Indiana, USA. The IGWMC is an international information and training canter for ground water modaling which conducts a program in applied rasearch on ground water modeling, organizes an annual series of short courses, provides assistance in workshops and saminars, operates a clearinghouse for ground water mod and publishes the Ground Water Modeling Nawsletter. Negotietions ere currently underway to initiate issued activities in cooperation with the Outch research organization TNO by opening an office in Delift, The Natheraction and the Company of the lands, in lata 1983. An international policy group, assisted by an international advisory committee, provides ovarsight to IGWMC

The succassful applicant will have a background in ground wetar hydrology preferably at the Ph.D. leval. He or she must possess a minimum of five years exparience in conducting studies of quantity and quality of ground water resources and should be acquainted with theory and application of modern ground water modeling techniques. Experience in project management and training/aducation is preferred.

As the senior menegement person in the HRI-IGWMC office, the incumbent will menage the daily activities of the Indienapolis office of IGWMC. Mejor duties of the position include planning end implementing IGWMC activities in the North, Central end South American ragion, facilitating information tasks of the center, which include initializing and meinteining contects with ground water modelers, rasaarchers, field techniciens and water resource managers. Incumbent will also provide oversight of and participation in the Center's training progrems and all technical tesks for the Cantar. Parson will serva as general ground water specialist for other HRI anvironmental research progrems.

Persona Interested in applying for the position should, before March 31, 1983, sand curriculum vite and namae of threa professional references to:

Darrell R. Fishal Business Manager Holcomb Research Institute Butler University Indianapolis, Indiana 46208

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# Experimental & Solar Physicists

Lockheed Missiles and Space Company's Research Laboratory in Palo Alto, CA, has openings for a SOLAR PHYSICIST and an EXPERIMENTAL OPTICAL AERONOMY PHYSICIST in our Space Sciences Laboratory. These Labs are located on the beautiful San Francisco Peninsula just minutes south of Stanford University.

### Solar Physicist

The successful applicant will be expected to conduct and publish original research on solar flares as a member of the Lockheed X-Ray Polychromator (XRP) team. This research WILL make use of existing XRP and related data or new observations to be acquired following the repair of the Solar Maximum Mission (SMM) in 1984. As an active member of the XRP team, this physicist will participate in planning and executing the observing program of the renewed XRP and SMM.

This position requires a PhD degree or its equivalent plus experience in solar research. A background in plasma physics is highly desirable.

### **Experimental Physicist**

A position in experimental optical acronomy is crimently open where the candidate is expected to rainy our experimental/observational programs in anional and anightive physics using ground based, airbonne and spacecraft based optical instruments. This physicist will participate an existing programs, become involved in the development of chalaries duction techniques for analyzing photometric specificaciónic and imaging data and eventually he expected to develop one's own interests in research programs. A PhD in physics. space physics or a related discipline, the experience in scientific data analysis, the development of space handware and the involvement in satellite, rocket or shurtle programs is essential. A willingness to travel to remote sites will be required

Both of these appointments and salary levels will be commensurate with the credentials of the person selected. Qualified and interested candidates should send their resumes, references and list of publications to: LMSC, Professional Employment, Dept. 600-0215, P.O. Box 504, Sunnyvale, CA 94086. Lockheed is an equal opportunity, affirmative action employer. U.S. CITIZENSHIP IS REQUIRED.

# The Lockheed Missiles & Space Company

Almospherie Selentist-Programmer/University of Navada System. The Desert Research Institute has all opening for an Atmospherie Scientist-Prugrammer inhibit the Monaspherie Scientist-Prugrammer inhibit the Monaspherie Scientist-Prugrammer inhibit the Monaspherie Scientist-Prugrammer inhibit the Monaspherie Scientist-Prugrammer inhibit the Atmospherie in the purseance analism and interpretation of aircroft cloud physics and and interpretation of aircroft cloud physics data and the remove rensing instruments in cloud physics and weather modification esearch projects. Initial emplratis will be un deteloping computer-generated-graphics data display capabilities at DRI. Emphasis will then shift at data analysis and interpretation and publication of results. Opportunities exist for deschiping own research projects. Desirable qualification include a Ph.D. in atmospheric sciences with 2 to 3 years experience in eom puter-assisted aircraft and/or remote sensing data display and analysis. Strong candidates with the M.S. degree in atmospheric sciences or related fields of physical science with extensive relevant experience will also be considered and are cucuraged to apply. The salary will be altractive and is negotiable, full benefit pachage is included. Send letter of application, a complete resume stating particulass at education and experience, and names, aildresses, and telephone minibers of three individuals who can comment knowledgaahly about your capabilities, postmarked by April 1, 1983, it: Mrs. Harrison, Personnel Office, Desert Research Institute, University of Nevada System, P.O. Box 80220, Reno, Nevada 89506.

An Affirmative Action/Equal Opportunity Enipleyer.

Isotope Geologiat/University of Wyoming. The Department of Geology/Geophysics invites applications for a tenure track position at the assistant professor level in isotope geology. The applicant's field of specialty may be stable or radiogenic Isotopes. The successful candidate will be expected to leach undargraduate and graduate courses and conduct his/her own research program.

Current research at the University of Wyoming includes: crustal evolution in the Archean and Proterozoic; the systematics of magma contamination: carbonate diagenesis; fluid-rock interaction; and the tectonic erolution of compressional and extensional oragenic belts. We hope the successful candidate will complement these nucles as well as develop o strong, independent program. Applicants should suhmit a vita, transcripts, a latter decribing future research interests, and names of three references to Dr. Robert S. Houston, Head, Dept. of Geology/Geophysics, PO Box 300ti, University Station, University of Wyoming, Laramle, WY 82071. Glosing date for applications is February 28, 1983.

The University of Wyoming is an equal opportunity. Affinitabitive avitan enaphyer.

Upper Ocean Physical Modalles. A paydoctoral opper ocean Physical Modalles. A psychocoral position in upper ocean equatorial modelling supported by NSF is available in the Memorale Air-Ses Interaction Ligoury at the Florida State University. Minimum calary is \$21,000.yr. Qualified Ph.D. should send vita and names it 3 terrores to Professor Janes f. O'Biten, The Florida State University. Collabassee, Fl. 12306, or call 1904 644-1581.

Virginia Polytechnic Instituta and State University/Structucal Geologist. The Department of Geologist. The Department of Geologist Invites applications for a tenure-track position in Structural Geology at the Assistant of Assistate Professor lavel. The position involves teaching at the graduate and undergraduate Isvel and supervision of graduate student research. Candidates should be processorianted with Interests in patential are required. Closing date for applications is April 15. The position is available from September 1, 1983.

To apply send n vita with list of publications, summary of present and proposed research and the names of three seferences to: Kenneth A. Eriksson, Chairman of Search Committee, Department of Geological Sciences, VPI & SU. Blacksburg, VA

Altimative Action/Equal Opportunity Employer

Assistant Research Geologist. Scripps Institution of Oceanography has a pointing available for research in various fields of geochemistry including rampling of submarine hydrothermal rent system in the orean held work in roleans gas meas on land, field work on the Geenland fee Cap drifting and sampling fee cores, and laboratory work on isotopic and chemical studies of gases. The starting salary is \$22,900; starting dote is April 1983. An initial two-year appointment it envisaged. Required qualifications: Experience in the submersible RV AL. VIN sampling hydrothermal vent linids; experience in high-temps rature fumarole sampling in volconic gas areas and with seam walls in geothermal fields; experience with gas chromatography, mass spectrometer isotope studias; high vacuum techniques; and a Ph.D. in geology and/or geochemistry. Send rasume and threa references to H. Craig, Geological Research Division, A-020, Scripps Institution of Oceanography. La Jolla, California 20095, by April 1, 1983. Nois: Material sent to arrive at S1O office March 1 should be addressed to Ms. Javnel Moure of the above address or to H. Craig, RV MEL.

VILLE, Papeete, Tahiri.

The University of California, San Diego, is an equal opportunity/affir maive action employer. Faculty Positions/Drexol University. The Department of Physics and Atmospheric Science has several openings for both visiting and tenute track faculty at all levels starting in the fall of 1983. Applicants must have errors teaching and research interests its one or more of three sreas in the Department: Atmospheric Science—inconnected of the atmosphere; and remute sensing of the atmosphere; aphere; EXPERIMENT AI, PHYSICS—hiophysics, quantum optics, nuclear and solid nate physics; THEORETICAL PHYSICS—alonnic, undecodar and

opportunity/affir marive action employer.

Postdoctoral Position in Dynamical Meteorology. The Department of Atmospheric Sciences at the University of Washington announces a reseoreli position for work on problems of large-scale dynomics and transport in the stratosphere and mesosphere. The successful applicant should have demonstrated capability in diagnostic studies of atmospheric circulation and/or in dynamicsl theory and modeling. Position is for one year with possibility of saxension to three years and begins about July 1, 1983. Candidates should send curriculum vitue and threa letters of reference to:

uf reference to:
Prof. Conway B. Leovy
Department of Atmospharic Sciences AR-40
University of Washington
Seattle, WA 98196
For Information phona 206-543-4952.
The University of Washington is an affirmative action/equal opportunity employar.

action/equal opportunity employar.

Postdoctoral Fellowship, Igneous Petrology/University of Now Mexico. The Institute of Meteosities, Department of Ceology, has an opening for a post-doctoral fellow in igneous pairology, to work un lunar asimples. Main thrust of the research will be directed towards petrogenesis of brecclatad and pristine lunar highlands rocks. Close intaraction with other histitute staff and studants working ou lunor samples and interories, is expected. Experience in electron interoprobe analysis or neutron activoton snalysis desirable but not essential. Position is available on or about July 1, 1983. Appointment is initiolly for 1 year, with renewal possible. Send resums, has of publications and 3 letters of refarence by May 1, 1983 to K. Keil, Director, Institute of Meteorilics, Department of Ceology, University of New Mexico, Albuquerqua, N.M. 87131.

The University of New Mexico is an equal-opportance of Meteorilics, Department of Ceology, University of New Mexico is an equal-opportance of Meteorilics of New Mexico is an equal-opportance of Ne

nuclear physics, quantum optics and non-linear dynamics. dynamics.
Interested persons should send resumes and the names, addrasses, and relephone numbers of their references to:

Dr. Harman Newstein, Arting Head
Department of Physics and Armosphetic Science Drexel University

Philadelphia, PA 10104

[215] 805-2707.
Decod Holyersite is an ornal namentunity and a

Drexel University is an equal opportunity and al-firmative action employer.

Faculty Poaltion/Deportment of Geology, University of Illinola at Urbann-Chompaign. Applications are solicited for a terrore track assistant produces pushion in axperimental took physics. The presion is expected to be lilled by August 1983. Salary is upon depending upon experience. We are seeking a creatic individual who is interested in either foundation or ductile behavior of rocks and their geological applications. An earned Pl. d. is required. The Department of Geology, the Materials Research Lation above and the Engineering College of the University for getter offer excellent research facilities for rock physics suchles. For equal considerations, interested individuals should send extricultur vitae, list of publications, research interests and the names of three or more references by March 5, 1983 by: opportunity/affirmative action employer.

Faculty Position to Solid Earth Geophysics. The Department of Geological Scianres of Columbia University seeks applicants for a faculty position Itanure-track or tenured) in Solid Earth Geophysics. Consideration will be given to candidates in earth-quake estamology, manne selsmology, and other duciplines in Solid Earth Geophysics. Appointees would be expected to develop a vigorous vesearch program at Lamont-Doherty Geological Observatory and to contribute to integraduate and graduate teaching in Geophysics. Prefarence will be given to candidates will strong backgrounds in quantitative methods of analyzing geophysical dats. Qualified candidates should submit thair curriculum critae ond the names of three referees to Prof. A.B. Watts, Chairman of Solid Earth Geophysics Search Committee, Lamont-Doherty Geological Observatory, Palisades, New York, 10964 by April 15th, 1983. Columbis University is an equal opportunity/affirmative action enaployer.

send curry
search interests in
search interests in
are rafavences by March
Albert T. Hsul
Dapartment of Geology
University of Illinois at Urbana-Champaign
1301 West Grean Street
Urbana, Illinois 61801
217-333-7732.
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Faculty Positions/The University of Iowa. The Department of Physics and Astronomy anticipates on or two openings for tenure-track assistant professors or two openings for tenure-track assistant professors or visiting professors of any rank in August 1983, Preferenca will be given to experimentalists in any area for the tanure-track positions. Current research interests include astronomy, atomic, condanased mattar, elamantary particle, laser, nuclear, plasma, and space physics. The posidons involve undergraduata and graduata teaching, guidance of research students, and personal research. Intarcested persons should sand a résumé and a statemant of research intarcests, and have three letters of recommandation sant to Search Committee, Department of Physics and Astronomy, The University of Iowa, Iowa City, IA, 32242.

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Geophysical Sciences. Application

Geophyaical Sciencas. Applications invited for a possible teorire-track position at the Austrania Professor level beginning August, 1985. Doctoral research evel beginning August, 1985. Doctoral research programmer applicants are expected to teach undergraduate and graduate courses in structural geologyctonics/remote sensing and to develop a research program in any of these areas. The department has a well equipped reinning areas. The department has a well equipped reinning assuring laboratory. If faculty, 150 undergruduate sensing laboratory. If faculty, 150 undergruduate smajors, and 30 graduate students. Sniary documentations of vite, a brief description of research intotests, and arrange to have three letters of reference by une 50, 1983 to Dr. Randall S. Spencer, Chalipman, University, Norfolk, Virginia 23508—8512.

An Affirmative Action/Equal Opportunity Employer.

Postdoctural Research Associate Posidians/John Hopkins University. Applied Physics Laboratory. Positions are available to studies of gameia magnetis placers, and for studies of cardi magnetis placers and amount placers. Selected caudidates of participate in the analysis and interpretation of databather from deep space probes (Younger), or particle, held, and atmospheric emodings data from earth including spacer all. Problings are one year remediate outpur motions with the file dating dates. Applications should be addressed to Mr. Stevan F. Savie, Department I ER 258, The Johns Hopkins University, Applied Physic Laboratory, Johns Hopkins Road, Lamel, Mr. 20170.

An Expud Opportunity Europear MF.

University of Nehraska-Lincobelicology. Seek temmestrack Assatant Professor in general area of technics, geodoxists, structure and common geology ellerity: August. Learching dialoc car he arranged to reflect spiciality of sweesful applicational fear two roomses per semester. Respotes Palla and strong commitment to excellence in teaching and treasure/unith arion. Alluminous office; Palla and strong commitment to excellence in teaching and treasure/unith arion. Alluminous office; ella transitipis, and names of three references in Thismon, Heratiment of Goodogy, University of Nebraska-Lamont, Lincoln, Nebraska-Bassa-Blo.
Alluminative Action-Equal Opportunity Employer.

Pustductural Pasition in Space Plasma Physici-latinamity College involve applications for a ne-year pustable total fellowship which will become available in June 1983. The recipient is expected to develop theoretical models of magnetospheric co-tent sheets and boundary layers and to study suf-our processes on his instabilities and magneticist teconomistion which was as in such diserts. commercial which carve he sink layers.

Send letter of application, results, and the mass' of two references by April 15 to Professor B. Soc. nemp. Thayer School of Engineering, Dartmont College, Hanney, New Hampelite 0.1753 (603645-2883). Darumuth College is on equal apportunity life mative action employer.

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Physical Oceanographar/Computar Programmse. The Florida Stata University is seaking applicants to help carry our advanced research that involves numerical modeling and rime series analysis. Candidates should have an M.S. in physical oceanography or computer science and experience with principles of ocean circulation modeling and oceanographic data processing. Experience on CDC mainframes plus Furtran IV is pavicularly desirable. Position available ru start immediarily. Rank is Research Assistant. Salary will be competitive according to training and experience. Send tennue and professional references by March 28, 1985 to V. Hsueli, Dispartment of Oceanography, Florida State University. An affirmative action/equal opportmonly employer.

STUDENT OPPORTUNITIES

Congressional Selance Fallowship/ACU. Opportunity for a one-year assignment on the staff of a congressional committee or a House or Sanate member as an advisor on a wide range of scientific issues affecting public policy questions.

Individuals who are AGU members and U.S. residents are invited to annly. A broad box kyroned in denis are invited to apply. A broad background in science is expected, as the various duties entailed re-quira the applicant to be articulata, literate, flexibls, and able to work well with people from divasse pro-feraintal backgrounds.

and the to work well with people from divisise pro-fessional backgrounds.

Public policy background is not required although such experience and/or demonstrable interest in ap-plying science to the solution of public problems is

The fellowship carries with it a stipend of up to \$27,000 plus travel allowances.

How to apply:

Candidates should aubinit a letter of intent, a controlled my viac, and three letters of recommendation. The letter of intent should include a statement of why the fellowship is desired, how you qualify for it, what issues and congressional situations interest you, what rule you entrision as a congressional science fellow, and what outcome you hope for in relation to career goals. The individuals trum whom you request letters of vectorized them whom you request letters of vectorized trum whom you request letters of vectorized alton should discuss not only your professional competence, but also other aspects of your background that make you particularly qualified to severe as a Congressional Science Fellow.

Send the above to: Department MP, Congressional Science Fellowship Program, American triophysical Union, 2000 Florida Avenue, N.W., Washington, D.C. 20009.

Application Deadlina: March 31, 1983.

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Tharmal processes
Crinical structure and magnetism
Tectonic modeling
Seismic data processing
Contact: Dr. Kevin P. Furling
Dept. of Geology/Geophysics
University of Wyoming
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Laranie, WY \$2071
\$007/766-1379.

Craduata Fellowahlpa in Coastal and Contloental Shelf Sadimantation. The Geology Dapartment of Dalhousic University invites applications for graduate lellowships leading to M.Sc. and Ph.D. degress with specialization in the field of cuartal and countinental shelf sedimentation. Potential veserch areas include shoreface and sedimant processes, instrumentation for sedimant transport studies and construction of coastal factes modes. Opportunities exist to take part in the supcoming Canadian Coastal Sediment Study and to gain scientific cruise axperience on vessavich vessels from Bedford Institute of Creatugraphy. Awards cover a calendar vest suppend and are valuad, after fees are deducted, between \$6500-\$8000. For further informassion or application please write:

Geology Department Dalhousie University Halifax, Novo Scotia CANADA BSH 315.

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### FIFTH CONFERENCE ON THE PHYSICS OF THE JOVIAN AND SATURNIAN **MAGNETOSPHERES**

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esions: on safellite effects on the magnetosphere, interaction of the magnetosphere with ringe, dust, and satellite surfaces, radio and plasme wave emission in relation to per-ticle and iteld structure, energetic particles, magnetospheric configuration, dynamics, and energy budgel.

Abstract Deedline: March 15, 1983 Further Information: Jupiler/Satum Conlerence c/o Prof. H. 8. Orldge, 37-241, Massachusetts institute of Technology, Cambridge, MA, 02139, (617) 253-7501

### **Council Sets Pace** For '82–'84 Action

The December 1982 meeting of the AGU Council, the first in the 1982-1984 bienminn, has set a new pace. It is the first Council Meeting in the memory of any of those participating at which every Conneil member was present in person. This record attests to the importance Section presidents and presidentelects place on their responsibilities as representatives of their sections and as members of what in effect is AGU's Board of Directors: and it is a further tribme to the value they

Both the Council and the AGU Executive Committee held their meetings on December 9, 1982, during the Fall Meeting in San Francisco. President Van Allen, President-elen Drake, General Secretary Merediali, Foreign Secretary Kisslinger, and Executive Director Spillhous constitute the Executive Committee. The full Council includes the Executive Committee and the President and President-elect of each Section. At its meetings the Council usually addresses administrative matters such as brolgering, examines existing operations, and considers proposed new programs. The Executive Committee acts on hehalf of the Council between Council meetings; it is specifically charged with approving Chapman conferences, the cosmusorship of other

meetings, and several other largely adminis-

At its December meeting the Council reluctamly accepted the proposal of the Meetings Cummittee that the 1985 Spring Meeting be held in Bahimore during the week beginning with Memorial Day. At its meeting last May the Council directed the Meetings Committee to try to avoid the Memorial Day holiday. However, Bahimore in 1985 was available only over Memorial Day, and any other week in one of the six or seven other cities considered would be cosilier and less convenient. Drawbacks of other sites included higher rates for hotel rooms, smaller meeting room facilities, and more difficult access by air. Because of the Conneil's concern about using the Memorial Day week, the Executive Committee subsequently asked the Meetings Committee to develop a plan for AGUs annual meetings through 1990. The Committee is now gathering data on member preferences with respect to all the factors that must be taken into account when assessing a potential

meeting site. Also under consideration is whether AUU should have one or two annual meetings. The case was Inreefully made by one Council member that AGU entrently does not have two national meetings but rather two regional meetings. He went ou to say that this regionalization has diluted the value of each Annual

The Public Affairs Committee presented

American Geophysical Union 1983 Budget-Income and Expense by Activity

	Income	Expense	Net	
Publications division				_
Journal of Geophysical Research	2820	1830	990	
Water Resources Research	42tř	302	124	
Reviews of Grothysics and Shace Physics	412	308	104	
Geophysical Research Lellers	278	181	97	
Radio Science	24-1	161	83	
Tectonics	62	52	10	
Eas	522	513	9	
Chinese Geophysics Series	29	26	3	
Russian translations	603	494	109	
Books	419	288	131	
Subsidiary publications	107	80	27	
Other publication services	8	4	4	
Publications division overhead		443	(443)	
Total	5930	4682	1248	
Member Programs division				
Membership services	64			
Spring Meeting		63	1	
Fall Meeting	153	93	60	
Other meetings	220	115	105	
Public Affairs	56	29	27	
Education 0. 11	_	51	(51)	
Education & Human Resources Awards	_	17	(17)	
	_	7	(7)	
Associated societies	36	24	12	
Other Member Programs activities	66	67	(1)	
Member Programs division overhead	_	76	(76)	
10(3)	595	543	52	
Miscellaneous projects	75	55	20	
General & Administrative			:	
Administrative Division	_	573	(573)	٠.
Finance Division	75	201 .	(126)	
Executive Office	_	419	(419)	
Total	75	1193	(1118)	
Total operations	6675	6473	202	
Investments				
Rullding				•
Bullding and land Fund raising	271	326	(55)	:
Other in	250	-15	235	٠,
Other investments Total	70 .	7 .	63	1
	591	348	243	-
Total alf activities	· 7266 .	6821	445	41

In thousands of dollars. The line items showing overhead in the Publications and Member Programs divisions represent division-wide administrative expenses that cannot be easily assigned to individual projects within the division. The expenses shown in the General and Administrative categoy represent organization-wide overhead such as personnel, accounting, occupancy of pace, and executive staff time.

two proposals that the Council approved. The first was for a Science Policy Seminar series to be operated on a 2-year trial basis. Framer AGU Congressional science fellows will be asked to participate as seminar leaders and will be available to visit colleges and universities that would like to put on such seminars. The second proposal was to increase the Eas news writing staff with a half-time person to permit greater coverage of Crongressional and other governmental affairs. Initially the coverage will focus on key legislation. The intent is to inform AGU members of the issues when pertinent legislation is introduced and to provide updates on the progress of these bills, including the votes of each Congressman and Senator. Probably a dozen or sopieces of legislation will be followed this way during the course of a year.

In other action the Council granted the Hydrology Section an opportunity to attempt to work our details for AGU's continued pullication of translations from the Soviet bydrology literature.

The Conneil approved bylaws for both the Geodesy and Ocyanography sections. These bylaws will be published together with other Section news in the near future.

The Council also approved an anemiment to the Union livlaws diat changes the name of the Occanography Section to the Ocean Sciences Section. This is merely a substitution of the words Ocean Sciences for the word Oceanography in Article I of the bylaws. This report of Council action serves as the of-

ficial notice to the Union membership of the iment to change the hylaws. The amendment must be ratified at the next Conneil Meeting in order to become final.

The 1983 budget was approved by the Council (see table). The proposed surplus for 1983 meets the annual target set by the Council several years agn; the target is part of the Union's goal of increasing its reserves through contributions from the membership and through surpluses from Union opera-tions. The 1983 projected surplus of

### The Climatic Effects of Volcanic Dust and Aerosols in the Upper Atmosphere

Friday, March 18, 1983 8:30 a.m.-5:00 p.m. National Bureau of Standards Auditorium 325 Broadwey, Boulder, Colorado

Spousored by the AGU Front Range Branch Cosponsored by the Deuver/Boulder Chapter American Meteorological Society

This symposium will bring logether prominent researchers in the fields of climatology, meteoresearchers in the haids of climatology, meteo-rology, glaciology and volcanology to summa-rize the state of knowledge on this subject in an interdisciplinary forum at a lavel appropriate for a non-specialized, but scientiocally literate audiance. The meeting is open to the public.

Topics will include The history and causes of climatic variations
 Explosive volcanism
 Atmospheric affects and observations
 Climatic and cultural consequences.

Contacts: Jules Friedman and Raymond Walts

U.S. Geological Survey, P.O. Box 25025
Ms0 Stop 964, Denver, CO 80225
(303) 234-3676 (Friedman) or 234-3493 (Walts)

For further Information, see Ess Meetings Secon, February 13, 1983.

# **Ahoy!**

2 weeks

March 9 Abstract Deadline

1983 AGU SPRING MEETING May 30-June 3

Contact: AGU Meetings 2000 Florida Avenue, N.W. Washington, D.C. 20009

(202) 462-6903 D.C. area (toll free) 800 424-2488

Call for papers published in EOS, November 30, 1982 and January 18, 1985

Sall Back Into Baltimore

### The June Bacon-Bercey Scholarship in **Atmospheric Sciences for Women** 1983-1984

Expressly for women intending to moke o career in the atmospheric sciences. This monetary assistance, provided through a gift from June Bacon-Bercey, a noted meteorologist, will be given to a woman who shows academic ochievement and promise. To qualify, condidoles must be one of the following:

 o first-year graduate student in an advanced degree program in otmospheric sciences:

 on undergraduate in a bachelor's ences who has been accepted far groduate study:

o student at a 2-year institution offering of least six semester hours of olmospheric sciences, who has been occepted for a bachelor's degree program, and who has completed all of the courses in atmospheric science offered of the 2-year institution.

Awardee selection will be made by the AGU Subcommittee on Women in Geophysics in consultation with the AGU Atmospheric Sciences Section.

For opplication forms contact: American Geophysical Union Member Programs Division 2000 Fjorida Avenue, N.W. Washington, D.C. 20009 462-6903

800-424-2488 outside the Woshingfon, D.C. orea Application Deadline

May 1, 1983

Last, the Council elso approved the consolidation of a number of funds whose underlying activities no longer need separate accounting. The Monograph Fund was incor-porated into the Union's General Fund; the Bucher Fund and the Terrestrial Magnetism and Electricity Fund were incorporated into

the Endowment Fund. The Executive Committee approved a Chapman Conference on Reconnection in the Earth's Magnetosphere to be convened by E. Hones and held in Los Alamos, New Mexico. October 3-7, 1983. It also approved AGU cospontorship of the Fourteenth Lunar and Planetary Science Conference in March 1983 and the Sixth Guodwana Symposium to be held August 13-15, 1985. The Executive Dong Wilson (O), James C. Witcher (H), Committee also approved an Ocean Sci-Qingcheng Xiong (O), David B. Zilkoski [G). ences meeting in early 1984 which would be rimilar on the one held in San Antonio in February 1982.

In other administrative actions the Executive Committee approved a new schedule of limioraria feer AGU's journal editors and renewed the Letter of Agreement with the Es-

Council meetings are open to the membership of the Union; the Section secretaries, journal editors, and chairmen of AGU's conmittees are especially invited to attend. The next meeting of the AGU Council will begin at 5:30 P.M. on Tuesday, May 31, at the Hyatt Regency Hotel in Baltimure.

### Membership **Applications** Received

Applications for membership have been re-reixed from the following individuals. The letter after the name denotes the proposed primare section affiliation: the lener A demores the Annospheric Sciences rection. which was formerly the Meteorology section.

### Regular Member

Richard Arimona (O), Laurie S. Balistricri (O), Roger G. Barry (A), Ewa Aaria Basinska-Lewin (SM), Elaine J. Bell (T), James ti. Ber-

ryman (S), Richard M. Berilacqua (M), Michael G. Brown (O), Fazal H. Chaudhiy (H), James Chen, Robert Colten (H), Joseph M. Davila (SS), Steve Flexser (V), David R. Hanson (S), Kevin C. House (T), J. Charles Klose (O), Charles Knight (M), Randy L. Koroter (V), David F. Leland (H), Yuan-Hui Li (V), David C. Logan (T), Manuel Lopez-Puertas (SA), George W. Lynts (T), Manavendu K. Mahan (S), Robert C. McDowell (T), Janice Mirsky [S), Xuenxue Mo [V), Eugene J. Morgenilialer (GP), Gregory F. Neuschafer (O), Allen H. Olson (S), Dean Ostenaa (S), Max T. Otten (V), John F. Paulson (SA), Donald E. Puccini (G), Michael R. Reeve (O), Pierre I. Rigard (SA), Jill Robinson (V), G. Roesijadi (O), Gordon F. Saville (SM), Luiz-U Schacfer. Dirk L. Smith (T), Krzysztof Stasiewicz (SM), Joann M. Stock (T), Fritz Theyer (GP), Richard C. Ward (A), Charles J. Weschler (V),

### Student Member

Raisuddin Ahnad (O), A. H. M. Shah Alam (S), Khedar Alsaqri, William S. Ashron (H), Narline G. Berlow (P), Leta K. Blome (T), John E. Hretches (V), Chin Chen (S), Melody Clifford (O), Michael P. Connelly (V), George C. Decles (G), Jennifer E. Dick (O), John R. Donat (O), Natalie Drake (V), Keith W. Dunham (O), Barbara L. Durrow (V), Cynthia J. Ebinger J T), Eddie Fulbright (V), Craig S. Fulthorpe (O), George S. Carlon (T), Juan E. Hamre (V), Richard H. Heyman (V), Kathryn M. Holtzmann (V), Shu-Li Huang (11), Sra Hyuck Im (O), Eleni I. Immuidou (S), R. Scott Jackson (G), Cheuer W. King (11), Glen R. Kisselman (S), Rundal D. Koster (H), Sudhirr Kshirsagar (H), Lucia Lecato (S), Dennis Lindwall (S), David J. Matty (V), James W. McDougall (T), Helen C. Neugebauer (T), Lindell Ormsbee (H), Howard Quin (S), Greg S. Raskin (P), Klaur Rath-felder (H), J. Alberto Rodriguez (II), C. Robin Russ (O), Stephanic Ross (T), Richard J. Rouer (O), Elizabeth A, Rowan (H), Douglas Ruhlin (O), Ramona Rusk (SM), William M. Ryan (A), Siephen Salyards (S), Elizabeth R. Schernier (V), Sherry L. Schiff (D), Benjamin C. Schurayte (V), Gary Streile (H), Michael F. Sullivan (S), Khagendia Thapa (G), Kerin Thomas (SI, Brian J. Tucker (M), Arms G. Venkataraman (SM), Juhn J. Vilveiros (T),

Michael R. Walter (H), Lacy B. Ward (S), Edith G. Williams (), Marty Williams (GP), Thomas Al. Wissler (T).

Associate Member

Chapman d Conference On. Magnetospheric Currents

> Earth The Tides Inn irvington, Virginia April 5-8, 1983

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axciting program! Topics include: Airkeland and ionospheric Currents Magnetosphere-lonosphere Coupling Current System Modelling Currents, Convective Flow, and Electric Fields Current Systems of Other Planets Also: Recreational Activities, Refreshments, Celebrations, Receptions, Meeting Souvenirs

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Margaret St. Peters (G)).

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COLUMNTE STUDIES OF MY ESPECIFIC EQUATION AL ERROGRAMM

E.J. Weber itenougheric Physics Branch, Air Porms Geophysics Laboratory, Hanteen AFG, MA 017311, J. Mars. and A.L. Johnson.

Coordinated ground and airbores measurements were conducted at three points along the Asconsian island magnetic meridian to investigate the distribution of solutilistion-producing law occiol issuestherio irregularities within an isolated equatorial plasms depletion, Airgiow beasurements near the northern Applets as each y about that igregularities are confined to the region within a Rioo of origiow depletion. The alignow measurements are also used to map the Sepletics region along magnetic filed lines for comperison with scintilistion measurements near the negative general and near the genjugate point at Ascension island, seally about the the scintilistic firrequiarity region is amounted for the scintilistic firrequiarity region is aspected for the scintilistic firrequiarity region is aspected for the scintilistic firequiarity. Account distances of the scintilistic firequiarity incompagnic irrespolarities, application, it is supported in the scintilistic fire the scintilistic firequiarity. Account distances of the scintilistic firequiarity is depleted and the scintilistic firequiarity. The scintilistic firequiarity is depleted to the scintilistic firequiarity is depleted and the scintilistic firequiarity. The scintilistic firequiarity is depleted to the scintilistic firequiarity is depleted to the scintilistic firequiarity.

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AUTOMATIC CALCULATION OF ELECTRON DENSITY PROFILES FROM OIGITAL IDNOCRAMS. J. PROCESSING OF ENTOR-SIDS IDNOCRAMS. Badd W. Solutach (University of Lowell Center for Atmospheric Pescarch, 450 Alian Street, Lowell, M. 01834) and Meang Xuaq(n. Automatic acelling of bettomolde Digisonds (poograms gives the R and F roughous the inscens with high accuracy. Polarization and incidents angle Information is that incogram choice the ostraction of the vertical, ordinory polarization and truce from quick on well as disturbed longrams. The smalling olgorithm is tended with diginomia longstome from Cooke Ray, Labrader, which show sprond P about 507 of the time. Dompite those of liberbed conditions for 2 is delormined within one-half negheter for 473 ionograms out of 577 dering Jonery 1950. A profile inversion algorithm television the electron dessify profile incoming automated hi[t] points. Patabolia profile chappen are contempd for ibn E-region and the velicy between E and F-layer. The F-layer is approximated by a single oum of Chabyshev polymomicia, and the entire profile is described by a see of 16 centered values. The CPU Ling required for isanging occiling and alectroe desaity profile calculation to the profile the program calquired in addition to the profile the program calquired in addition to the profile the program calquired, minimum virtual heights, frequency and range spread, average acho amplitudes and Deppler shifte.

3345 Loncophuric distribunces
OFF-PERPENDICULAR PROPARATION BY PERECULARITIES IN
HIGGLE LATITUDE R<sub>U</sub> LAYERS
Tokachi Tomoka (Geparison of Almaphoris Eclencon,
University of California, Los Augolos, California,
90024) ead 8. V. Vonkafeumatrik
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close to line strict perpendicular propagation. (Us
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J. Geophya, Ras., Blea, Paper JA0198

### Separates

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### Aeronomy

0430 instruments and techniques OSETWATION OF STRATOSPHERIF VERTICAL COUNT DISTRIBUTION BY A MECL LIDAR O. Mchimo (Pepartment of Shootrical Engineering, Kyushu Dhiversity, Fabooka 812, Japani, N. Marda, N. Yahamura, and M. Mirros

Branium-234 And -235 were found to be highly nn-riched reloited to eronium-238 in several rain samples collected of Fayeiteviiio, Arkaness, during the months of April and May 1980. The anome less prentan appears to have originated from the Soviet goldlife Corons 54 which fell over Canado on 24 danuary 1978. The branium follout occurred just about the time Moent St. Helens erupted on 18 May 1980. The ionicatorist of tirl in rain increased markedly offer the aruption of Hount St. Melens and it appeared as it a large quantity of natural branium was injected into the drugsphere by the voltante cruption. The pattern of varietion of the concontrations of uranium in rain after the aruption of Sount St. Helens ess found to be similar to that of guitantian seas found to declarate the aruption of seasons. Seas. Green, 100121 isotopes.

1420 Chemistry of Island
REMSTRIVITY OF ARIOIFICATION OF LAKES 18 THE FLAT
TOPS WILDERDISS AREA, COLORADO
John T. Tork (U.S. Cenlegical Survey, box 25046,
18 415. Burner Federal Center, Lakemond, Colorado
022231 and Dass Rriegn Adams
Luffac of the Flat Tops Wilderness Area in corthvestern Colorado are measilive to acidification if
precipitation to the area baccase as aribic as that
of the cortheastern Duitod States. Athalinity
values as would as 70 microsquivalents per liter
ocrut in the higher airfitude lakes. Hour lakes at
altitudes of 1,180 metars or greater are predicted
to have alkalisity values of 700 alcrosquissicote
per liter or lass. About 307 harcares ero celrulated to
be semaitre to acidification.
Scanitivity, acidification.
Water Resout. Res., Paper 20002

G. Echima (Department of Shortical Engineering, Kynshu Dhivers Hy, Phinois 812, Ingani, h. Hands, S. Varanne, and M. Hirofo
Based on the differential absorption lider technique
(Glai), stratespheric vertical come distributions have
hase neasured by Red lider at Throche 13M, 13071 ains a
fittude range of 19-25 ms, A brook and an an altitude range of 19-25 ms, a brook of the common of Manon (3M, 14051). As a bottle of the second range of 19-25 ms, a brook of the common of Manon (3M, 14051). As a bottle of the second range of 19-25 ms, a brook of the common of Manon (3M, 14051). As a bottle of the second range of 19-25 ms, a brook of the common of Manon (3M, 14051). As a bottle of the second range of 19-25 ms, a brook of the common of th

A GENERAL CIRCULATION MODEL STEET OF ATMOSPHERIC CASSON MOMORIDS

J. Pinto-(Rartaré University, Center for Sarth and Flanctery Physical 29 Oxford Si., Combridge, Ma')

Y. Yung, D. Biod, G. Rudsell, J. Larner, J. Hamson, Land S. Hamed

The carbon monomide tycle is eladed by lacorporating the known and bypothetical costres and minks
in a fracor model which wass the whost generated by
a general electrication wodel. Photochemical prodettion and less torus, which depend on the tradition conrentrations, and colculated to an interactive Technica.
The computed global distribution ded seasons!
variations of CO are compared with observe lone to
cheato teneraints on the distribution and magnitude
of the soutras and winke of CO, and on the trapospheric
elumidance of OB. The aimplest model that accounts
for swellable observetions requires a low initude
plant mourtes of observed tons requires a low initude
plant mourtes of moore in 1.3 x 10.5 g yr -1, in debtion
to sources from incomplete combustion of Touch!
Twis as original of a mathans. The globally averaged
OB concentration calculated to the model in 7 x 10.5 cm.
Models which talculates globally averaged OB concentrations such lower than our mounced value are not
consistent with the observed variability of CO.
Note models are also inconsistent with measurements
of plant hources.
J. Geophys. Hess., Gross, Paper 190077 of plant nou-cos. J. Geophys. Ess., Gross, Paper 350077

3734 Electrical Phonomons
OPOUCTIONS CONCERNING
ELECTRIFIED PARTICLES IN THUNORICLOURS
BASED ON ELECTRIC FIELD CHANGES ASSOCIATED
WITH LIGHTNING

WITH LIGHTNING

B. Voanegyl, Almospheria Solancea Rozonrek
Centar, Stala University of Now York at Albany,
Albacy, New York 12222.

The relationships between the space cherge in
thenderclouds and the lightning that it causes are
to complar or ac poorly understood that
dedoctions excounting the neitero or location of
this cherga based solely on observations of
lightning are open to question. Honis intersolions and processes, slorms, perticles and
sereante).

1. Geophys. Res., Green, Paper 2017/0

3770 Perticias and marcanis
ACMOSPHESIC THERITY OVER AFRICA - OLOTHERED BY THE
Et CBLCHOM ERUPTION:
2. Jacolche, G. A. d'Almeida [Institut für Marsotologis
University of Malos, J. R. Germany) University of Maios, Y. R. Garpany)

Hesserments of stanospherio iurbidity over Africa to 1082 show comsiderably higher veless as to 1981. The date of the horizontal visibility indirate dust eform sativities of similar strength. Therefore it is concluded that he ineressed terbidity is caused by the voltants aroption of 81 Chickon in Masico sarly in 1082. The horizontal is the order of 0.1 units of the description, structure, structure,

### Particles and Fields-Ionosphere

Sils Aurores MIREGR INSTABILITY AND THE ORIGIN OF MORNINGENE AURORAL STRUCTURE.

V. T. Chio (Space Sciences Laboratory, The Aerospace Corp., Sil Segundo, CA 00245) M. Schulz, J. F. Paonell and A. M. Kishi Auroral options imagery shows serked differences between surveil feeries of the arening sed morelog sactores the separation between differes and discrais accorse in the separation between differes and desorate sectors in the separation between differes and desorate accorse in the separation served distinct in the send suitiple banded sexuctures eligent along sees and suitiple banded sexuctures eligend along sees also serked differences; downward sinsippe beams and inverted-y signiferes pracer the syming sector; as allowed to the banded served to the service of the sorting sectors of the structure of the survival served similar to the difference supports on the sorting sectors. The theory is based on anothering the institute of the structure of

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American Geophysical Union 2000 Florids Ave., N.W. Westilington, D.O. 20009 Attention Trahirt slogan

Seismology

6940 Phanchopa telarad to eathquake prodiction PRE-SEISHEC SUPTUPE PROGRESSION AND GREAT EAPHQUARE INSTABLISTICS AT PLATE BOUNDARTES V.C. Li [civi] Engineering Department, Haspachusetts Institute of Technology, Cambridge, Massachusetts, D2(

short varius long time selentaphility due to the stiller short varius long time selentaphartor reap towards instability. The procedures for prediction of rupture progression and instability are illustrated in detail for an electic-brittle crace model of all p some sevenous

and parameters of the model or ally mone advance and parameters of the model are chosed consistently with great earthquons silon and atress drops. For example, we affective orach tracture energy of the order dailof J/m² at the peei. 7 to 10 km below surfame, ot s Gausalan Hell-shaped distribution of fracture energy with depth, with variance of the order 5 km, simulating

atrength build-up in a melamogenic layer, lveds to pro-distion of momental selecte atress drops of 30 to 40

bars and slips of 2 to 5 m in great strike slip earth-quafe ruptures breaking 100 to 400 km along strike. Precursory marface attaining in the celf-driven stage Is predicted to procede at s distinctly higher rate

over time intervals beginning 3 to 10 months before much as earthquake, this is rowell being greater for longer distances along strike over which the pre-sels

6970 Structure of the Frust and upper mantle CRUSTAL AND UPPER MANTLE STRUCTURE OF THE MORTHERN AND CHITALL RISERA NEWADA Berbare O. Navio (4.5. Guolgiral Survey, 345 Maddle-lield Road, MS 17, Monio Park, CA 94025) and George

Thompson
 Telescipais dela were recorded within the Sierra

Nevade to look for lateral variations in the upper mention. The data were collected at both temperary

and permanent stations and P-wave residuals were computed. After correcting the P-residual Sata lor trustel and topographic effects, there is aill wariation of as much se 0.3 to 0.5 a from the north

trustal and typographic affacts, there is still a variation of as much as 0,3 to 0.6 s from the north end of the Slove Newade to Mono Lake located east of the cantral get of the range. In addition, there are against least the trust least of the cantral get of the range in addition, there are against least the same that the service perterns depending on the assurth of wave serivale. Two simple meating approaches have been used to infor the upper ment be velocity structure from the observed variations in travel case. In the first, it is second that the velocity structure from the observed throughout a depth range of shour 50-100 fm. One model that like the data indicates a sorth-to-south trend in uppur-manile P velocities from shout 7.9 km/s at the north and of the Siers to 7.6 km/s near those Lake. Superimposed in a west-to-mass trend from 1.5 in/s under the Siers hewade treat to 7.7 in/s cost of Lake Tahos. In the second modeling approach, a figed velocity contrast to assume between the lithosphoric intrimass. One model, consisted with the resulting from variations in lithosphoric intrimass. One model, consisted with the change of the Sierts to the the common the lithosphoric intrimass. One model, consisted with the common the lithosphoric intrimass. One model, consisted with the common to the Sierts to the first term to the same the model of the Sierts to the second common the lithosphoric intrimass. The loss than 1. The loss than 1. The 100 km at the north one of the Sierts to the Sierts

3.45 Loneapheric disturbances
A GIFFERSTIAL-COPPLER STUDY OF TRAVELING ICHCENTRASTIAL-COPPLER STUDY OF TRAVELING ICHCENTRASTIAL-COPPLER STUDY OF TRAVELING ICHCENTRASTIAL STUDY OF TRAVELING ICHCENTRASTIAL STUDY OF TRAVELING ICHCENTRASTIAL STUDY ICHCENTRASTIAL ST

While the character of the fluctuations and a north-te-south motion would be consistent with a nource to the accord lonosphera, there seems no locrease in incidence during magnetically disturbed increase in incidence during magnetically disturbed those. Notworks, in summer, the waves are seen equally to the north and the south of the station. It seems openible that there may he seny sources tor these waves distributed in latitude and that the observed locations are controlled by the Hiltering effects of 7-region wieds.

Rad. Sci., Paper 380167 5545 Ionospharie diaturbancaa INFLUENCE OF THE E-REGION DYNAMO ON EQUATORIAL

SPREAD F
N. R. Benson [Centar for Space Sciences & Physics
Program, Dalv. of Texas-Dalles, Bichardson, TX 750801
R. Ramataol and T. N. I. Pertarson
The integrated & region Pederson roadsetivity ren be
an important parameter in determining whether the
buttonellos of the equatorial P layor will be stable
againer the Saylulph-Teylor eravitational instability.
The P layer is observed to become unstable when it The P layer is observed to become unstable when it rises to great heights after summer. One affect of this height rise is to Secretaes the stabilizing influence of lon-cautral collisions at Y region heights. It is shown here that the same seatured electric field that releas the P layer also decreases the Pederson conductivity of the P region, which farther Seatabilizes convertive overturning. Because the conductivity of magnetir tubes that penatrate the main Y layer is large computed to The E layer contribution these effects are important only for the bottomside of the equatoriel P layer. [Equatorial spread f, S region conductivity).

J. Camphys. Res., Clue, Paper JA0172 J. Camphes, Res., Clus. Paper 3A0172

### Particles and Fields— Magnetosphere

DOTS Pleams Mayes
LOWER SYRKID DRIFT INSTABILITY WITH TEMPERATURS GRAGIEST IN A PERPENDICULAR SHOCK WAVE
T.M. Zhou, H.K. Noog, C.R. Wu [1957. Phivprelty of
Marylend, College Fark, Md. 20742], D. Winoke
The lower hybrid inotebility is studied in the perpendicular how shock geometry including (inite bors
efforce and as sloctron isoperature gradient. The
flute Ik. ~ 03 mode. which for constant electron temperaters. Is stable at the shock, I designifized
for suificiently large temperature gradient f(Tol 21).
Nusetical splurions are presented for reads in which
the ion distribution is either a drifting Maxwellian
or consists of two Maxwellians to represent the elfert
of tedicted ions at the shock. Implications of intron acceleration at the bow shorf ora slee discussed.
J. Geophys. Res., Blan, Paper 3A0229

5780 Wave Propagation
OSSERVATIONS ON THE CEOS-1 SATELLITE OF ANISTLER HOSE
STOTUS TO WEST TEEP DE THE OFFICE INVIGATION SYSTEM RAISANTIA DI BARBURDI HOMAN 1. Seubart (Danish Space Romanth Instituto, Lundiofia-voj 7, DN-2000 Lyngbe Donmark), E. Ungatrup and A. Bahwan

vol 7, Dh. 2000 Lynghe Denwarki, C. Ungatrup and A. Bahugan

\*\*Maidlot mode signola of 0,2-1.1 accord duration at 10.2; 11.33 and 13.6 kHz loamched by the Unego has faction System transmillor located in marthern Horse, have been observed on CEOS-1. The elghala mete observed both Inaide and duteldo the plasmapphere in too toglone of the adjunctaphere, in December 1977 of 10<sup>3</sup>-200 north of the equator on the more injected and in 10.2-200 north of the equator on the more injected and in 10.3-200 north of the equator on the more injected and in 10.3-200 north of the equator do the more injected and in 10.3-200 north of the equator on the more injected and in 10.3-200 north of the equator on the more injected, the "instantaneous" seve normal directions more calculated as found to have employ of 120°-140° to the magnetic field of the earth pointing 0°-40° cosmood. These polices have employed the arder of 10 M/m and refractive indiace above 30. At limes the amplitude on wild to the save normal directions, but often the amplitude and the have normal directions or attendity modulated as a lime soul of 0.2 seconds. We eliminate these features to ray peth alaing. The algebie ere often prolonged up to 1 second, which he extended the reflected from the inpulse in the extended red the inpulse of the content members. While the signosts do not iringer alreng emissions, as do cheeve «0.1 accord long bursia at the tell of some direct pulses. direct pulses. J. Geophys. Res., Olus, Paper JAO184

ISBN 0-87590-624-024-0

single Q about which one appared all or a appared data constant an upper results layer with a Q<sub>i</sub> value between 60 and 80. An alter-hetive laterpratation to possible, however, If Q<sub>i</sub> is the upper creat is one constrained to be the same throughout the shelf. In ther be the seas throughput the minet. In that interpretation, only a Single path mean the sahif mergin is characrerised by less Q value to the upper cruet. The mechanise for thoma

8. J. Hitchell (Copartment of Kerth and Atmospheric Sciences, Saint Louis University, Saint Louis, History), A. Kijio
Ttu Sulfa-made met-ed of Chang and Hitchell
[1081) has been used to obtain codels of shear
save Q (Q<sub>1</sub>) For the crust of the Beronts chell.
The coched, employing sepiltude spectra of fundamentals and higher-made Rayleigh waves, is
annial to selementam senerated by four duclest

explosions to Howays Zeblye and an earthquake in Spiteborgen. It is shown that the marked is mast semitive to Q in the upper cruer and less so to Q in the lower cruet and lo Q. The slegis Q, model whith best applaion all of the

Geophysical Monograph 24

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using a two-station mathod for the path near the shelf onegle are consistent with rhose pro-Direct by the model obtained using the multi-

CNSTABILITIES AT PLATE BOUNDARTES

V.C. Li Clivii Engineering Department, Hassachusetts
Institute of Technology, Cambridge, Massachusetts, 22(39)

J.R. Rice (Givisice of Mplied Solances, Harvard
University, Cambridge, Massachusetts 22(39)

Ve present a procedure for modelling the Initiality
quest-static upward programation of a zone of slip from
some dagth in the lithouphers toward the earth's surlace. Stress trensmission in the lithouphers is annlyzed with a generalized Blassack model, in which eleatic lithoupheric ristes undotgo plane atress deformations
and are occupied by an elementary foundarion model to a
Maswalliae viscoslastic anthencophers. Upward programelon of rupture ever of Helte length of plate toundary,
corruspending to a selmmic gap along strife, is annlyzed by a methad based on the "line-spring" concept,
whereby a two-dimensional sati-plane analysis of the
upwards progression provides the relation between lithospheric thickness averaged stream and sips sad on a
boundary condition in the generalised element plate
model. The formulation scaults in a non-ilnear integral
equation for the rupture progression as a function of
time and distance along strife. A simpler approximate
single degree of fronden acalysis procedure lebescribed
and shown to isad to isstability resulon that can be
formulated in terms of the silp soltening slope at the
boundary falling balow the elastic unloading stiffess
of the surroundings. The results also ladioste a delay
of stimata (selsmid) instability due to the stiffer
short varsus long tuss selhessapheric reaponse, and
presider a liest portion of anal-driven orang towards 6980 Surface Waves

RAYLRIGH WAYES EXCITED OT THE DISCONTINUOUS ADVANCE OF A

BETTURE FROM
John G. Berrie (Theoratical and Applied Mechanics,
Bulveralty of Hillon's, Orbson, Hillon's, 68001, Jac O.

Achenbarh and Andrew N. Horria

Analytical results are presented for Raylaigh waves

excited by a sudden chenge to the rete-of-growen of a

sub-surface some of rupture. The cutved rupture front

advances across so inclined plane. The rupture can be

thitle or sobselve tractions can ect at its front. The

Ramblysis consists of two parter first tay theory is

used to esiculate sevefront approximations to the seves

molited when the repture-front speed suddeely rhanges.

Secondly a representation longraif for the Rayloigh

wave, where the integration is performed over a surface

sectoring thus rupture front, is constructed using the

selited waves in confrontion with an appropriete Green's

tempor. This integral is evaluated opympeatically,

Synthetic accisiongraphs are constructed which fillustrate how the rupture process, and the grometry of the

rupture-front sud the lauti-place effort the maintain

Parties of Payleigh waves. (Raylaigh vaves, sub-surface rupture-front end the lault-place erract the back of Rayleigh waves. (Rayleigh waves, sub-autisce

J. Georphys. Rus., Rrd, Fapor 281001

0999 General (Satellite Surlacus) INTHREMETATION OF MIGHE-OLSE PROTONETRY OF PHOBOS AND Kavin D. Pang | Jet Propulsion Loberatory, Colifornia Institute of Yerbuckey, 4610 Oak Grave Drive, Pasadone California, 91109), Jack W. Rhoads, Come A. Banaver, Karl Lumme and Eduard Coupil

the phase curves twhole-disk brightness vs. solar phase angle; of the Martian satellites were compiled out to 125 phase angle from groundbased and spaceurest photomeric observations. Yet data were modeled with to its passe angle from agroundessed and approvers; photometric observations. Yhe data were underled with the Lumma-Spoul! theory, Accurate please lutegrals, perophase geometric abledon and Soud albedon were obtained from the hest-fit theoretical curves. The microstructural and particulate surface properties of Muchon differential from those of Datone. The watellifest very alailer whole-body densities, seechemical and nicrophysical baloup suggest a termin origin. However, having spent a considerable portion of their lifethess in pro-indiv to Mars probably did modil; their surface characteristics. The value of the surface roughness (loss than that on an asteroid of cooperable sizes, the debris manule on Lolons and the grooves on Phobos are probably widered of such bedilitations. Cooperable, Phobos and Depros should be used as goddle of asteroid-rises objects only with resurvation. (Phobos, believe, surface, photosety). I. Compleye, Post, Foll Paper 281938

6999 Generol IEarthquako Prodictioni
ASSIGNING PROBABILITY GAIN FOR PRECURSORS OF FOUR LARGE
CHINESE IANTHQUAKES
7. Cao and h. Aki (Deportment of Earth and Planetary
Sciences, Marsachestett inscitute of Yarhmology,
Individy, Mattachicetts (2)341
We desiond the concept of probability get associated
with a precursor lait, 1991 to a set of precurses
which may be mutually dependent. Making ase of a new
farmule, we derive a criterian for gelecting protesters
from a given data set in order to tolculate the
probability Defane four large Chinese Gerthquakot ata
calcelated. They are approximately 0.09, 0.09, 0.07 and
0.08 per day for 1975 Malchady H=7.11, 1976 Tongston
(H=7.81, 1076 Longling H=7.6) and Songpan (H=7.2)
earthquakos, respectively. These resultit are
ancouraging because they suggest that the layestigated
precursory phonomena may have included the complate
information for marthquake prediction, it least for the
obors marthquakot. With this method, the sup-by-step
approach to prediction used to China say be quantified
in tarms of the probability of meringuake occurrence.
The they we is curve (where P is the probability of
anothquake occurrence at them of sharing does not
increase with i finearly but oure rapidly es the ine of
aarthquake opermena. Iprobability get,
conditional probability, marthquake prodiction,
precursory datal
i. Geothys, Reas., Red, Paper 281931

OR99 Comersi (Sciencity)
EXISIC SUPPORE WATTERNS IN CANACA, NEXICO
Fomils Trains [Scientificated Laboratory, California
Youthture of Technology, PageCome, Celifornia, Oli251
and Karen G. McNelly
The spatic-temporal patterns of onlands serivity for
events with body wave magniaude, map 4.0 are investigaated for the three onest recent large enthquakes in
the Gazzon ragion of southern Mexico [Aug. £1, 1965,
M.-7.6, N.-7.5, Aug. 2. 1080, Ng-7.1, Ng-7.3, Nov. 29,
1978, Ng-7.6, Ng-7.6). A master retailogue of earthquakes is copplied for the acelyses using the intereatimni Saismological Center [185] catalogue supplamental by the National Earthquake information Service
(NEYS) catalogue; the sweats are then relocated with
the Joint Hyperenter Determination (JRD) mathod.
At this magnitude threshold, we find that the aftershock tons of the 1865 serthquake was solublelly
quiescent for at least teamty mouths prior to the main
event; the 1068 serthquake was preceded by one year of
foreshock type antivity clustered in the aftershock mone of the seath of the subduction rows in
Gazzon remaies unbroken by these serthquakes. Is
eddition, some callegum problems are polested our
which era importes to interpraisitions of selective
patteron.

). Geophya. Raw., Red, Paper 201744

### Tectonophysics

Olio Convection turrests
THE RELATIONSHIP RETWENT SURPACE TOPOGRAPHY, GRAVITY
AHOMALISS AND THE TROPHAVIRE STRUCTURE OF CONVECTION
ARTY Paraces (Dept. of Earth and Flansiery Sciences,
Hessachaselis Institute of Teshnology, Cushridge,
Hassachaselis Institute of Teshnology, Cushridge,
Hassachaselis Institute of Teshnology, Cushridge,
Hassachaselis associated with consection is a flui Messacheseite Cally) and Staphon bay
Messacheseite Cally) and Staphon bay
Messat sirusan associated with consection is fluid
layer whose hounderies can defore produce tapography on
itoss hounderies. When the equations of antion are
linear integral relations between topography on the
bounderies and the temperature atrecture can be found as
a function of wavelength. Expressions of this kind have
been derived for the trees of consection to a consistent
riscosity fluid when lowered is effects are amplighble.
The total gravity speady is the son of dontributions
don to the topography so the two bounderies and to
temperature sectations withis the fluid and station
lotages valuations have any series and the temperature
situators can also be derived. At wavelengthe large
compaced to the depth the shape of the kerula is the
integrally particularly that for gravity, is sensitive
to is houndary boudillons used. The ironsfer function
havese gravity and topography is also sharehereatic of
the boundary conditions used. The ironsfer function
haves gravity of topography is also sharehereatic of
the boundary conditions used. The ironsfer function
cases most laked there is a transition bayes the share is transition the proper is also sharehereatic of
the boundary conditions without at wavelengthe
inconsisting the temperature of the force of the condition of the depth of
and long-wavelength between which occurs at wavelengthe
is and long-wavelength between the proper of the provincy
can deform as well as the upper boundary to gravity
is and to a force of the provincy
tand to show a partyrobres. The surface topography
tands to show a partyrobres. The surface topography
tands to show a partyrobres. The surface topography

low values may be telered to shearing and rift-ing which occurred when Greanism! separated iron Rvelhord. Bapid arraquetion slong other paths across the mantral porilon of the sheal can be explained as being due either to a rhick separance of low-Q seminants or to disruption of the crustal wase guide by lateral artuctural Mounte Ewing Series Volume 4: complexities. A comparison of observed and synthetic selements land support to the latter interpretation. Attoustion coeffic-ients obtained for the fundamental Raisigh made

Earthquake Prediction An Inter**d**national Review David W. Simpson Paul G. Richards During the past 5 years occurrence of prehistoric earthquakes has come from geologic studies of fault zones, cularly trenching and the deting of offset geologic units. One of the goals of the Third Ewing obtain en overview of large earthquakes o saveral countries. Case histories of recent major evenis in Chine, Jepan, Mexico, the U.S.S.R. and the U.S.A. are included Renewed optimizm about earthquake

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prediction generated at the symposium is

kernel is slways rate at the bottom boundary. The lack of any significant nurface empression produced by comparature veriations near the bottom of the layer provides an explanation of the stoliar relationships provides an explanation of the stoliar reintionablys between gravity and topography associated with the dissipilar temperature structures produced by different codes of beating. At least for colluiar coavection surface topography and gravity anosalise fargety reliect temperature verisitions in the vicinity of the uppet thereat boundary lager. This is consistent with an explanation of goald encounties over add-opens swells to torms of converient beneath the lithouspare where the lower pert of the thermally defined plate acts as the upper thermal boundary lager of the convection, (Gravity encounters, surface topography, namely

J. Grughys, Fes, Red, Paper 281881

81% Hear Flow (Grothermal Receivers)

81% Hear Flow (Grothermal Receivers)

82 At AND MASS TAMSFIR IS A 14ML-70% configuration

80 Outproude Resignation in Murrel (Art Paris)

8. Prair and D. F. France (Grothermal Lagranging)

8. Prair and D. F. France (Grothermal)

8. And I'm Jerman (Grothermal)

8. And

J. Geophys. Rea., Red, Paper 380022

815G Plate tectories
PALEOMAGNETIC TEST OF THE EMPEROR FRACTURE
ZONE HYPOTHESIS
R. C. Cardso (Department of Geologisel Sciences,
Northwestern University, Evanston, Illinois 20281)
Late Creinceous pelaemagnetic data from the Pacific
plate were used to test Farrar and Dixon's [1881]
hypothesis that "1700 km of stribs-alip occurrented
duting the early Terliary slong the Emparor freeture
acce system an 2000 km long NV-SE freeding tecture,
which consists mainly of the Emparor trough, the
Gerdner sessionals, seed the Line islands. The data
strongly diagrees with this hypothesis insiesd the data derent sessions, and the Line session. The data are consistent with no metion having occurred between seafoor east of the Emperor fracture zone and seafoor west of the Emperor fracture zone. [Pacific plain, reconstructions, apparent polar weader). Gamphya. Res. Lear., Paper 211414

Gamphya. Res. Lear., Paper 211414

O160 Postglecial phanomens
THE VIROUSITY OF THE LOWER MANNIE AS IMPERED
FROM MONATIONAL DATA
C. A. Freen [Depr. of Geology, Arisons Sters
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Ustil rancelly meas earimenes of the deep
hantle viscasity were besed on analyses of postgiscial uplific and there were no arrions estinates of the asonitivity of the derivad wistonity solotions Co veriscince of the input peraseters, such se these associated with the serizes leading. In this paper the visconity of
the lower ments is servised at by making scomparleass of the observed secular morions of the
serifity recision axis with the theoratical reonite From a layared viscoelastic, retarring
serth, which has have subjected 40 glaciel forslog, Our model, sensiteting of an elastic lithomphera, a two-leger, adiabatically stratified,
viscoelastic textin, and as inviscid core, is
sessentially acalytical end this askes it secuncically lessible is use as an aid for conducting
an extensive stanificial on the inconducting
an extensive stanificial conducting
an extensive stanificial processor. Both
sees of rotal lossi bate, polar sandor and noncidal deceleration of the laught of the day,
have been employed to constrain the visconity for
paper bantle and liss between 1 and 4 a 10<sup>2-20</sup>,
Our casulte, which just rely on the decend bermonto of the atralo field, also lead to: 6 deterpidation of sh apper bound to the thickness of
the slobelly averaged lithpaphara. This wales,
resign barvers 10 and 190 km, suggeste thet
arrong fatarel, hearquestiles between casaic,
and continented plates may actied a few invadred.
of thicmeters laid the support maile.

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